While drawings can be used as prior art, they must clearly show the claimed structural features. But, drawings must be evaluated for what they reasonably disclose. MPEP 2125 first section. In this case, the drawings must be interpreted in view of the specification which describes them. As reference to the '017 and related 4759661 patents will show, there is no teaching of chamber like the present invention. The drawing appears to show a continuous curve chamber. But, it is an artistic rendering, and the words of the specification, specifically cited in the declaration of Nichols, teach that the sides of the chamber shown are in fact like those of the prior art, namely planar and angled.

There is no indication in Nichols '017 that the drawings are to scale -- not to mention the distorted nature of the view. The proportions of the Nichols Fig. 4 cannot be used as evidence of actual proportions. MPEP 2125 second section. Implicit in "proportions" is the shape of the curve of the cross section.

3. The examiner previously cited Fouss et al. Patent No. 4,360,042 as a basis for rejection, notwithstanding it is not being cited presently. The Fouss reference is relevant prior art which heightens the case for patentability of applicants' invention.

Applicants claim 37 is to a chamber having geometry which is a truncated semi-ellipse, i.e., less than half an ellipse, the major axis of which lies along the vertical axis of the chamber, e.g., as shown and described in connection with applicants' Fig. 3. Thus, the vertical height is less than half of the length of the major axis of the semi-ellipse, and less than taught by Fouss. While that difference may be stated rather simply, it is consequential and not an obvious variation.

The Fouss patent teaches various curves but not a truncated semi-ellipse, nor truncated any-shape. Fouss focuses on a parabola, but also shows a semi-circle (Fig. 10), a semi-ellipse (Fig. 9), and a multi-radii arch (Fig. 11). A semi-ellipse (and truncated semi-ellipse) is a specific mathematically defined curve. It is distinct form the other Fouss curves, both mathematically and with respect to the stress distribution and deflection which results. That is what Fouss teaches us in some detail. (Fouss has a base sheet connecting the bottoms of the opposing sidewalls, but that would not seem to be a factor with respect to sidewall stresses when buried in the earth.)

Applicant reproduces in Exhibit A certain relevant cross sections, namely certain drawings of Fouss along with their own Fig. 3, all on more or less comparable scale. There are evident shape differences, including the sidewall near the base. The sidewalls of applicants' truncated semi-ellipse chamber have a steeper incline near the chamber base than do the sidewalls of Fouss's semi-ellipse shape (or Fouss's semi-circle shape). Compare applicants' Fig. 3 with Fouss Fig. 9 or 10 . Similarly, the rate of change of sidewall slope with elevation is significantly different for applicants' semi-ellipse than that which characterizes the semi-circle or parabola shape chambers of Fouss. Fouss has taught how the shapes provide different load distributions and defections, due to the hydraulic force gradient.

A main focus of applicants' design is the chamber's ability to support overlying loads when the chamber is buried; and that necessitates that the sidewalls not only resist compressive stress and bending stress, but that they resist buckling. Those compressive and bending strains in the chamber wall vary with the fine details of geometry, as is taught by Fouss. Thus, seemingly small differences in shape make consequential differences in performance. Through testing, applicants have found that a truncated semi-ellipse is superior, as evidenced by the test data in the specification showing how strong their chamber is. Note that Fouss does not address buckling, which is part of appplicants' analysis.

Based on applicants' specification and the teaching of Fouss, one cannot say that the curve of a chamber is simply an obvious variation. There is no suggestion from Nichols '017 or DeTuillo 5,087,151 or Fouss, or the combination, to use any particular geometry other than those shown. Given the significant differences in behavior of what might seem small variations, it would not be obvious to even try applicants' truncated semi-ellipse. Even if Nichols '617 is taken as teaching a continuous curve, it does not add to the art of Fouss.

4. In paragraph 3 of the rejection, examiner cites the combination of Nichols in combination with DeTuillo in rejection of claim 1 and 7 (as distinct from the rejection of claims 8 and 9). However, the examiner does not say what elements are combined, not to mention there is no suggestion to combine, which is necessary to support the rejection. If examiner maintains this rejection, she is respectfully requested to articulate the reason for the rejection, i.e. why and how the references are combined. Applicants submit that there is no reason to combine, and that any combination would not teach applicants' claim 37 chamber.

5. Applicants' second argument about Nichols Fig. 4 is as follows, and is in the alternative, should the Fig. 4 drawing proportions be relied on. The rejection says that the Nichols chamber shape inherently has a major axis and that the center point of that axis is disposed below the base of the chamber.

However, that first presumes the Nichols geometry is radius-defined, e.g., a section of an ellipse or circle, etc. But, there is no basis for concluding that the shape of Nichols '617 Fig. 4 is a radius-defined curve. Given the indefiniteness of the angled drawing, the geometry could just as likely be a parabola or some other function which is not radius-defined. In such case, there would be no center point of major axis, and thus no inherency of major axis center point anywhere, and no teaching of the present invention. Secondly, if Nichols was taken to show a radius-defined curve, what indicates that it is a portion of ellipse, rather than for example a portion of a circle?

Nichols '617 Fig. 4 ought not be used for rejection because to do so appears to be (a) using hindsight and (b) imagining or selecting a teaching (i.e., semi-elliptical curve portion) which is not specifically taught. If examiner maintains her rejection based on Nichols she is respectfully asked to state how it is concluded that the Nichols geometry is radius defined, and how it is seen to be in particular a portion of a semi-ellipse.

6. Claims 38-39 relate to cancelled claims 4 and 33, i.e., aspect ratio. The rejection asserts that Nichols teaches a W/H aspect ratio of about 2.5 and that applicants' claimed ranges are merely variations and routine optimizations.

However, first, the claims are not to an aspect ratio, but a chamber having the truncated semi-ellipse shape with the claimed aspect ratios. As stated above, Nichols teaches nothing about a semi-ellipse, and therefore it cannot teach about W/H for such. From the teaching of Fouss and applicants, shape is critical. Therefore aspect ratio is critical because it affects shape.

Fouss mentions an aspect ratio H/W of 0.885 (W/H of 1.12) for the semi-elliptic chamber at Col. 11, line 52 on. The horizontal y axis in Fig. 16 is aspect ratio. For paralbolic chamber it says H/W of 0.45-0.9 (W/H of 1.1 to 2.2) are good; preferably W/H is about 1.5. Fig. 16 shows W/H of 0.8-3.3. However, the factors only consider strength under compressive and bending loads. Fouss does not mention analysis of buckling, which is an important potential failure mode. Nor does his analysis reflect consideration of other important factors, such as volume per unit length for storing water; weight of material per unit chamber length or per unit storage volume for cost; moldability or manufacturability; nesting for shipment (when the chamber is not foldable).

In a simplified view, making W/H small may be considered good by some, because it provides good vertical strength. But the chamber interior volume becomes small and nesting for shipment is bad. So, that drives toward making W/H large.

The examiner is referred to Col. 4, lines 6-26 of Pat. No. 5,890,838, copy enclosed. W/H ratios of less than about 1.4 to 1 are taught (in the patent, aspect ratio is H/W), but in combination with a bridge which uses the space between the chambers. Furthermore the '838 chambers have a roughly trapezoid cross section, which better accommodates a low W/H. The reference mentions chambers with H/W aspect ratios of 0.36-0.65, which would be W/H 2.8-1.5 here. Examiner is also referred to Pat. No. 5,511,903, previously submitted, especially Col. 9, lines 9-50, where low ratios are indicated to be bad.

Thus, applicants rebut, as a basis for rejection, that as the examiner indicates, there is a generalized teaching that there is some direction to optimize aspect ratio for any particular shape, or for all shapes; or that doing so is routine engineering. (See section 11, below, about routine skill, etc.) Applicants' claims 38-39 embrace a particular range which is less than the 2.5 to 1 ratio attributed to Nichols '017 Fig. 4, and less than other chambers in the prior art.

Regardless, the claims ought to be allowed as preferred embodiments, because of novelty from claim 37.

7. Claim 40 relate to cancelled claims 5-6 and the height percentage. That is, the degree of truncation is defined. The claim ought to be allowed because even if there was a teaching to truncate, there is no teaching for how much to do so, particularly for a semi-

ellipse. Regardless, the claim ought to be allowed as a preferred embodiment of the patentable invention of claim 37.

8. Claims 41-42 relate to chamber with flange details and cancelled claims 8-9, which were rejected based on DeTuillo in combination with Nichols. Claim 41 comprises a flange plus a support member. Applicant believes the examiner misinterprets either the claims or DeTuillo Fig. 1, where item 26 is the flange. DeTuillo shows only the flat flange and no support member. That is, there is no fin or other structure running upwardly along the length of the outer edge of the flange, as does applicants' part 11. See Fig. 3 and Fig. 6. Therefore, claim 41 ought to be allowed. Likewise, DeTuillo shows no connecting members 13, especially since there is no support member 11 to connect to. Furthermore, the claims represent a preferred embodiment of the patentable claim 37.

9. Claims 43-44 for chamber with endplate combination relate to cancelled claims 24-26. Applicants of course admit that endplates are known, but not the domed endplate; and, the claim is to the combination of the endplate with the patentable chamber, from which it at least obtains novelty.

10. Claims 45-46 are for a chamber having features like those in claim 41-42, but without the truncated semi-ellipse shape limitation. Applicant submits that they are patentable for reasons mentioned in paragraph 8.

11. Examiner at numerous places cites the routine skill in the art of storm chamber design, and optimization within known parameters. Applicants request that examiner state specifically where she finds this routine skill with respect to any continued rejection on such basis. MPEP 2144.03. Applicants are unaware of any text book teaching or course. (In comparison, there may be routine teaching and skill in the art of subterranean round corrugated pipe design.) But, applicants think a chamber is more complicated and unusual. Section 6 recites a number of important factors which are now considered in chamber design, by applicant, at least. Design is much more sophisticated than reflected in the early days of chambers, and in the old patent art; and, it is a normal product evolution. But that makes any design optimization less obvious, because the consideration of other factors makes for potentially confusing or contradictory trade-offs. The design of chambers is anything but routine.

12. Accordingly, applicants respectfully request withdrawal of the rejections as they may apply to the new claims submitted herewith, and allowance of their claims.

Respectfully submitted,
Kurt J. Kruger et al.

By _____
Their Attorney

C. G. Nessler
Box H
Chester, CT 06412
(860) 526-9149
(860) 526-1043

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Assistant Commissioner of Patents, Washington, D.C. 20231 on March 18, 2003

C. G. Nessler